Worksheet 2 Writing and following algorithms

Task 1

1. What will be the output from the algorithm below if the user inputs “Hi, Jo!” Explain briefly the purpose of the algorithm.

```
function encrypt(message, shift)
  message = lowercase(message)
  encryptedMessage = ""
  for x in message
      if x in “abcdefghijklmnopqrstuvwxyz”
          num = ord(x)              # convert to ASCII value
          num = num + shift
          if num > ord(“z”)         # wrap if necessary
              num = num – 26
          endif
          char = chr(num)           # convert back to character
          encryptedMessage = encryptedMessage + char
      else
          encryptedMessage = encryptedMessage + x
      endif
  next x
  return encryptedMessage
endfunction

# main program
shift = 3
msg = input(“Enter your message: ”)
encryptedMessage = encrypt(msg, shift)
print(“The encrypyted message is: ”, encryptedMessage)
```

Task 2

2. An array `marks` is defined as follows: `marks[15, 18, 14, 9, 16, 12, 10]`

A pseudocode algorithm for an algorithm is given below.

```
items = len(marks)
for i = 0 to items - 2
   for j = 0 to (items - i - 2)
      if marks[j] > marks[j+1]
         temp = marks[j]
         marks[j] = marks[j+1]
         marks[j+1] = temp
      endif
   next j
next i
print (marks)
```

One pass is made through the outer loop of the algorithm.

Complete the trace table below to show how the contents of the array changes.

items	i	j	temp	marks						
				[0]	[1]	[2]	[3]	[4]	[5]	[6]
				15	18	14	9	16	12	10

What is the name of the algorithm?

3. Complete the trace table to determine the purpose of the following algorithm. Test it with input 11 and 5.

```
x = input ("Enter the first integer: ")
y = input ("Enter the second integer: ")
z = 0
while x > 0
   if x mod 2 == 1 then
      z = z + y
   endif
   x = x div 2
   y = y * 2
endwhile
print ("Answer =", z)
```

x	y	z	x> 0	x mod 2 == 1	output
11	5	0	True	True	